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09/551,273	04/18/2000	Nozomu Saito	9333/237	1986

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BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER

LAO, LUN S

ART UNIT PAPER NUMBER

2643

DATE MAILED: 07/12/2004

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/551,273

Applicant(s)

SAITO ET AL.

Examiner

Lun-See Lao

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 8, 9, 11-17 and 20-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-9, 11-17 and 20-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Introduction

1 This action is response to the amendment filed on 04-26-2004. Claims 8, 22 and 26 have been amended. Claims 5-7, 10, 18 and 19 have been canceled. Claims 1-4, 8, 9, 11-17, 20-29 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 8, 11-12, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Andrea (US PAT. 6,061,456).

Consider claim 1, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a sound signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the microphone system comprising two microphones (11,21) having directional characteristics, wherein the microphones are positioned relatively close to one another, and the angles (see fig.6) formed by the orientations of the microphones with respect to a sound signal direction are different for each of the microphones (see col.6 lines 13-28).

While Sasaki does not explicitly teach that the sound signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5,

lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice. Placing the microphones in front of and above the position of the speaker's mouth by approximately the same distance would have been obvious for the operation of Sasaki.

Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

Sasaki does not explicitly teach that the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° , and that the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 45° .

Andrea teaches the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° (speaker's mouth (see fig.7b, (from MIC1 to 304))). As to the orientation of another microphone to form an angle of approximately 45° (between MIC1 and MIC2 to 304) with respect to the speaker's vocalizing direction, the microphones of Andrea (see fig.7b, MIC1 and MIC2 and col.23 line 29-col.24 line 30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Andrea to provide an active noise cancellation apparatus and active noise reduction apparatus which reduce background noise to an acceptable level.

Consider claim 8, Sasaki teaches a microphone system comprising two microphones having directional characteristics (see fig.3), an adaptive filter (see fig.2 (24)) that simulates a noise signal outputted from one microphone (21) by using a noise

signal outputted from the other microphone (11), and a calculation means (see col.3 line 11-col.4 line 65) that calculates a difference between these two noise signals, wherein the two microphones (11,21) are positioned substantially adjacently, and angles (see fig.6) formed by the orientations of the microphones with respect to a speaker's vocalizing direction are different for each of the microphones (see col.6 line 13-28).

While Sasaki does not explicitly teach that the sound signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice. Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

Sasaki does not explicitly teach the two microphones are spaced apart approximately 9 cm, in front of and above the position of a speaker's mouth by approximately the same distance, and the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° , and the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 60° .

However, Andrea teaches two microphones spaced apart approximately 9 cm (see fig. 7b), in front of and above the position of a speaker's mouth by approximately the same distance (see fig.7b); and the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0° (when the speaker's mouth face to the microphone (fig.7b, (from MIC1 to 304))), and the angle formed by the orientation of the other microphone with respect to the speaker's

vocalizing direction is set to approximately 60° (fig.7b (between MIC1 and MIC2 to 304 and see col.23 line 29-col.24 line 30)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Andrea to provide an active noise cancellation apparatus and active noise reduction apparatus which reduce background noise to an acceptable.

Consider claims 11-12, Sasaki teaches a microphone system further comprising a filter processing means that updates inherently (such as changing the tap) filter coefficients (weight vector) of the adaptive filter (see col.9 line 50-col.10 line 15); and the filter processing means receives a voice signal outputted from a microphone and a difference signal outputted from the calculation means, and updates inherently (such as changing the tap) the filter coefficients of the adaptive filter so as to minimize a power of the difference signal by using the LMS algorithm (see col.9 line 50-col.10 line 15).

Consider claim 21, Andrea teaches a microphone system of the distance between the two microphones is about 9 cm (see fig.9c, (between microphones 450 and 302) and see col.19 line 65-col.20 line 41).

4. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romesburg (US PAT. 5,796,819) in view of Chabries (US PAT. 4,658,426).

Consider claim 13, Romesburg teaches a microphone system (see fig.2) that executes an adaptive (28,30) signal processing by using output signals from two microphones (22,26) and outputs a speaker's voice signal with an improved SN ratio, wherein the microphones (22,26) are positioned close to one another, and the SN ratio of the output signal from one microphone is raised (inherent, because one microphone is closer and other microphone is farther from a speaker) while the SN ratio of the

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output signal from the other microphone is lowered (see col.5 line 10-38); but Romesburg does not clearly teach a first adaptive signal processor receives an output signal from one microphone and an error signal and provides an output signal to a subtracter, a second adaptive signal processor receives an output signal from the other microphone and said error signal and provides an output signal to said subtracter, and the subtracter outputs said error signal, the first and second adaptive signal processors executing adaptive signal processing to minimize the power of said error signal .

However, Chabries teaches a first adaptive (see fig.4, L_0) signal processor receives an output signal from one microphone ($X_0(n)$) and an error signal ($E(n)$) and provides an output signal to a subtracter (Σ), a second adaptive (L_1) signal processor receives an output signal from the other microphone ($X_1(n)$) and said error signal ($E(n)$) and provides an output signal to said subtracter (Σ), and the subtracter (Σ) outputs said error signal ($E(n)$), the first and second adaptive signal processors ($y_0(n)$, $y_1(n)$) executing adaptive signal processing to minimize the power of said error signal ($E(n)$) and see col.6 line 40-col.7 line 68).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg with Chabries to provide a microprocessor controlled device employing digital filtering techniques for suppressing noise and /or feedback.

Consider claim 14, Romesburg teaches a microphone (see fig.2, 22) is disposed almost directly above the face of a speaker (4).

5. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romesburg (US PAT. 5,796,819) as modified by Chabries (US PAT. 4,658,426) as applied to claim 13 above, and further in view of Lange (EP 457,176).

Consider claims 15-16, Romesburg and Chabries fail to teach a microphone system of the other microphone is spaced apart on the occipital side from the position of the one microphone; and a microphone system of the other microphone is spaced apart on the occipital side by about 1 to 5 cm from the position of the one microphone.

However, Lange teaches a microphone system wherein the other microphone is spaced apart on the occipital side (see fig.1 (1b)) from the position of the one microphone (1a); and a microphone system of the other microphone is spaced apart on the occipital side (see fig.1 (1b) from the back seat) by about 1 to 5 cm from the position of the one microphone (1a from back of the car).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg and Chabries with Lange to provide the microphone apparatus having better noise cancellation.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Romesburg (US PAT. 5,796,819) in view of Lange (EP 457,176).

Consider claim 17, Romesburg teaches an in vehicle microphone system comprising two microphones (see figs.8,9 (22,36)) positioned inherently at a height above a speaker's mouth, an adaptive filter (see figs. 3-7, (42,14,40,32)) that simulates a noise signal outputted from one microphone by using a noise signal outputted from the other microphone, and a calculation means (see col.10 line 10-60) that calculates a difference between these two noise signals, wherein one microphone (22) is disposed substantially directly above the face of a speaker (see col.10 line 10-60).

Romesbury does not teach the other microphone is spaced apart on the occipital side by about 1 to 5 cm from the position of the one microphone.

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However, Lange teaches a microphone system, wherein the other microphone is spaced apart on the occipital side (see fig.1 (1b) from the back seat) by about 1 to 5 cm from the position of the one microphone (1a from back of the car).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg with Lange to provide the microphone apparatus having better noise cancellation.

Claims 2 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as modified by Andrea (US PAT. 6,061,456) as applied to claim 1 above, and further in view of Miwa(JP 08-040070).

Consider claims 2, 9, Sasaki and Andrea fail to disclose a microphone is mounted on the sun visor of a vehicle.

However, Miwa teaches a microphone is mounted on the sun visor of a vehicle (see constitution).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki and Andrea with Miwa to provide the microphone arranged close to the narrow side of the sun visor facing away from the speaker/listener at only a very small distance from the sun visor.

7. Claims 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as modified by Andrea (US PAT. 6,061,456) as applied to claim 1 above, and further in view of Romesburg (US PAT. 5,796,819).

Consider claims 3-4, Sasaki and Andrea fail to teach a microphone system, wherein the microphones are mounted on the ceiling above the driver's seat of a

vehicle; and the microphones are mounted on the ceiling above the front passenger seat of a vehicle.

However, Romesburg teaches a microphone system, wherein the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the driver's seat of a vehicle; and the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the front passenger seat of a vehicle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki and Andrea into the teaching of Romesburg to provide the microphone apparatus having better directional sound.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Romesburg (US PAT. 5,796,819) modified by Lange (EP 457,176) as applied to claim 17 above, and further in view of Yoshida (US PAT. 5,473,702).

Consider claim 20, Romesburg and Lange fail to teach that a microphone system determines filter coefficients of the adaptive filter by an adaptive signal processing during a period of non-recognition of a voice, does not update the filter coefficients during a period of recognition of a voice, and sets the filter coefficients determined during the non-recognition of a voice to the adaptive filter.

However, Yoshida teaches that a microphone system determines filter coefficients of the adaptive filter by an adaptive signal processing during a period of non-recognition of a voice, does not update the filter coefficients (such as control signal ck) during a period of recognition of a voice, and sets the filter coefficients determined during the non-recognition of a voice to the adaptive filter (col.8 line 30-col.9 line 6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg and Lange into the teaching of Yoshida to provide an echo canceller to enable a noise canceller to adapt automatically to changes in background noise level.

9. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Kaneda (US PAT. 5,208,864).

Consider claim 26, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a speaker's voice signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the system comprising two directional microphones (11,21); wherein one microphone is oriented substantially perpendicularly to the speaker's vocalizing direction, the other microphone is oriented at an acute angle relative to the orientation of the one microphone (see figs.3,6-7 and col.6 lines 13-28), and the microphones are spaced apart from one another in the vocalizing direction by about 2 cm (see fig.8, d and col.6 line 48-col.7 line 49 and claim1 (first microphone and second microphone are adjacent to each other)).

While Sasaki does not explicitly teach that the speaker's voice signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice.

Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

While Sasaki does not teach said microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance.

Kaneda teaches a microphone system, wherein microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance (fig. 2(b), microphone 2).

Therefore, it would have been obvious to position the microphones above and to one side of the position of a speaker's mouth by approximately the same distance. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings of Sasaki and Kaneda so as to provide the ability to detect a speed period in an atmosphere of unstationary noise with higher precision (col. 4, lines 59-63).

10. Claims 22, 23, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Kaneda (US PAT. 5,208,864) as applied to claim 26 and further in view of Andrea (US PAT. 6,061,456).

Consider claim 22, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a speaker's voice signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the system comprising two directional microphones (11,21) (see col.6 lines 13-28).

While Sasaki does not explicitly teach that the sound signal (sound coming from the direction of an object, col. 1, lines 8-16) (sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37) is a speaker's voice, Sasaki teaches that the apparatus is a camcorder (col. 7, lines 58-64), which is typically used to record a speaker's voice.

Therefore, it would have been obvious to include a speaker's voice into the sound signal of Sasaki. When the teaching is modified as such, the sound signal direction would have been the speaker's vocalizing direction.

Sasaki does not explicitly teach that the microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance, are oriented substantially perpendicularly to the speaker's vocalizing direction and are spaced apart from one another in the vocalizing direction by approximately 7.5 cm.

However, Kaneda teaches a microphone system, wherein microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance (fig. 2(b), microphone 2).

Therefore, it would have been obvious to position the microphones above and to one side of the position of a speaker's mouth by approximately the same distance. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings of Sasaki and Kaneda so as to provide the ability to detect a speed period in an atmosphere of unstationary noise with higher precision (col. 4, lines 59-63).

Sasaki as modified by Kaneda does not teach the microphones are oriented substantially perpendicularly to the speaker's vocalizing direction and are spaced apart from one another in the vocalizing direction by approximately 7.5 cm.

Andrea teaches that the microphones are oriented substantially perpendicularly to the speaker's vocalizing direction; the microphones of Andrea (fig.9c (302)) are mounted on the headset. as the headset (see fig.9c 302) is rotated upwards and downwards on the hinge, the axes of the microphones move in the opposite direction over a wide range of angles with respect to the speaker (represented by direction to front of speaker. Obviously, substantially perpendicularly to the speaker's vocalizing

direction would have been formed during such rotations and the microphones are spaced a part from one another in the vocalizing direction by approximately 7.5cm (see fig.9c (from microphones 302 to 450) and col.19 line 65-col.20 line 41).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Andrea to provide the supporting member traverses an angular range, within which the main reception direction of the microphones intersects the headset, with a snap-type movement during pivoting of the headset.

Consider claim 23, note discussion of claims 2, 9.

Consider claim 27, note discussion of claims 2, 9.

11. Claims 24, 25, 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Kaneda (US PAT. 5,208,864) as applied to claim 26 and further in view of Romesburg (US PAT. 5,796,819).

Consider claims 28-29, Sasaki and Kaneda fail to teach a microphone system wherein the microphones are mounted on the ceiling above the driver's seat of a vehicle; and the microphones are mounted on the ceiling above the front passenger seat of a vehicle.

However, Romesburg teaches a microphone system wherein the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the driver's seat of a vehicle; and the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the front passenger seat of a vehicle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki and Andrea into the teaching of Romesburg to provide the microphone apparatus having better direction sound.

Consider claims 24, 25, note discussion of claims 3, 4, respectively.

Response to Arguments

Applicant's arguments filed 4-26-2004 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the argued configuration that the microphones are at approximately same distance in front of and above the position of the speaker's mouth (claims 1, 8), (remarks, page 9, 3rd paragraph), this is now met by Andrea. Note discussion of claim 1 for detail.

Regarding the argued configuration that the microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance (claim 26), (remarks, page 10, 4th paragraph), this is now met by Kaneda. Note rejection of claim 26 for detailed discussion.

Regarding the argued configuration that one microphones is positioned substantially directly above the face of a speaker and the other microphone is spaced apart on the occipital side by about 1-5 cm (remarks, paragraph bridging pages 9 and 10), the examiner respectfully disagrees. In Lange, microphone 1a mounted on the front corner of the seating is positioned substantially directly above the face of the speaker (front seat passenger) considering the car seat is typically moved forwards and backwards. The other microphone in Lange, microphone 1b, is spaced apart on the occipital side (fig.1, 1b is positioned near the back side of the head of the front seat passenger). The distance between such two microphones 1a and 1b is about 1 to 5 cm, considering the typical size of a car and passenger.

Conclusion

13. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9306

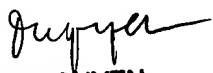
Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (703) 305-2259. The examiner can normally be reached on Monday-Friday from 8:00 to 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached on (703) 305-4708.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (703) 306-0377.

Lao, Lun-See
Patent Examiner
US Patent and Trademark Office
Crystal Park 2
(703) 305-2259


DUC NGUYEN
PRIMARY EXAMINER